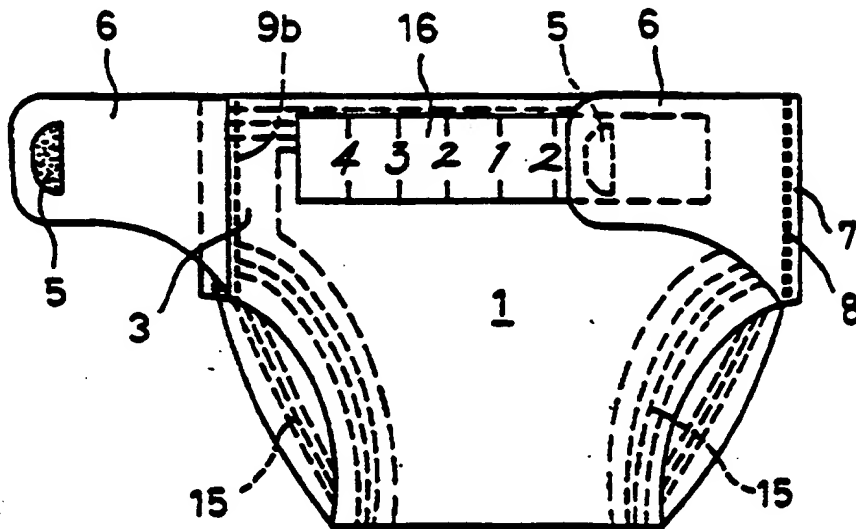




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(54) **COUCHES JETABLES**  
(54) **DISPOSABLE DIAPERS**

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(57) Couche dont les portions latérales opposées 3,3 et 4,4 de la partie avant et de la partie arrière 1 et 2 respectivement, et les extrémités 7 des rabats de retenue respectifs 6 sont reliées ensemble le long de lignes de liaisonnement 8; la partie avant 1 comporte des lignes de découpe 9b qui jouxtent les lignes de liaisonnement 8, le long desquelles ses portions latérales opposées peuvent être détachées des portions latérales opposées correspondantes de la partie arrière 2. La couche peut ainsi être utilisée soit comme couche-culotte avec les parties avant et arrière et leurs portions latérales respectives reliées ensemble, soit comme couche ordinaire avec les parties avant et arrière liaisonnées l'une sur l'autre au moyen des rabats.

(57) A diaper wherein respective laterally opposite side portions 3, 3 and 4, 4 of front and rear bodies 1, 2 and base ends 7 of respective fastening flaps 6 are bonded together along bond lines 8, and adjacent these bond lines 8, the front body 1 is provided with cutting lines 9b along which laterally opposite side portions of the front body 1 may be torn off from the corresponding opposite side portions of the rear body 2, and whereby the diaper is usable selectively either as pants type diaper with front and rear bodies bonded together along their laterally opposite side portions or as the open type diaper with the front and rear bodies to be connected with each other by fastening flaps just when the diaper is actually used.

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## DISPOSABLE DIAPERS

## BACKGROUND OF THE INVENTION

This invention generally relates to a disposable diaper and, more particularly, to such a diaper adapted to be selectively usable either as so-called pants type diaper having front and rear bodies which have been connected with each other already on a step of manufacturing so as to form a closed loop around the waist or as so-called open type diaper having front and rear bodies to be connected with each other so as to form a closed loop around the waist by means of fastening flaps just when the diaper is actually put on a wearer.

Japanese Utility Model Application Disclosure Gazette No. 1992-5826 discloses a disposable diaper comprising front and rear bodies which have been previously bonded together along one of the waist zone's laterally opposite side portions but can be releasably bonded together by a tape-like fastener along the other side portion. On the other hand, Japanese Patent Application Disclosure Gazette No. 1992-89050 discloses a disposable diaper comprising front and rear bodies adapted to be releasably bonded together by adhesive tape along at least one of the waist zone's laterally opposite side portions.

The diaper disclosed in the above-identified Japanese

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Utility Model Application Disclosure Gazette No. 1992-5826 is inconvenient to put it on a wearer no matter whether the wearer is in standing-up posture or lying posture, because one of said laterally opposite side portions is permanently closed. The diaper disclosed in the above-identified Japanese Patent Application Disclosure Gazette No. 1992-89050 is disadvantageous in that, when the waist-opening is widened in order to put such diaper on a wearer as it is usually done for normal pants having the waist line closed in a loop, one or both of the waist zone's laterally opposite side portions previously closed as in the case of said normal pants can be unintentionally opened and an expected effect of previously closing the waist line can be decreased to half, because such closure is made merely by adhesive tape (in the course of manufacturing).

Accordingly, it is a principal object of the invention to provide an improved disposable diaper having front and rear bodies which have been previously bonded together along the waist zone's laterally opposite side portions in the course of manufacturing but, if desired, can be separated from each other and bonded together again so that the opposite side portions thus bonded together again can never be unintentionally opened even if the waist-opening is widened in order to put the diaper on a wearer.

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SUMMARY OF THE INVENTION

The object set forth above is achieved, in accordance with the invention, by a disposable diaper generally comprising longitudinally continuous front and rear bodies and a pair of fastening flaps extending outward from waist zone's laterally opposite side portions of said front or rear body, characterized by said longitudinally continuous front and rear bodies being folded so that laterally opposite side portions of said front body are accurately laid upon those of said rear body; said fastening flaps carrying on respective inner surface adjacent respective front ends thereof fastening spots and having respective base ends laid upon the waist zone's laterally opposite side portions of said front body; bond lines along which said waist zone's laterally opposite side portions of said front and rear bodies and said base ends of respective said fastening flaps are bonded together; cutting lines provided inside and adjacent respective said bond lines so that said front body may be torn off along these cutting lines from said rear body; and each of said bond lines having a resistance of 1000 g/inch or higher to separation occurring between said front and rear bodies.

Preferably, said bond lines are formed by welding and said cutting lines are formed by intermittent cuts or perforations.

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According to a further broad aspect of the present invention there is provided a disposable diaper which comprises a front body and rear body. The front body is longitudinally continuous with the rear body and folded over with respect to the rear body so as to produce a completely formed waist opening, two completely formed leg openings and opposed side portions extending between each completely formed leg opening and said completely formed waist opening. The side portions are formed by permanently bonding the front body and the rear body together along permanent bonding lines having a separation resistance of at least 1000g/inch. Two fastening flaps are also provided and each has a base end bonded to a respective one of the side portions and an outer end that can be extended laterally with respect to the side portion to which it is attached. Fastening means is provided on each of the fastening flaps and adapted to engage the front body. Two lines of perforations are also provided in the front body and are each disposed adjacent one of the side portions and extend generally parallel to and inwardly of the permanent bonding lines. The two lines of perforations each extend between one of the leg openings and the waist opening, and each located inwardly of the base end of an associated one of the fastening flaps. This diaper construction permits the diaper to be put on a baby that is able to stand without the need to tear the front body along the perforation lines, or can be put on a baby that is not able or willing to stand by separating the front body along the perforation lines without separating the permanent bonding lines and thus fitting the separated front body and back body around the baby, and then, after fitting the diaper on the baby, engaging the fastening means of the fastening flaps to a portion of the separated front body.

**BRIEF DESCRIPTION OF THE DRAWINGS**

The invention will be described more in details by way of example in reference with the accompanying drawings, in which:

Fig. 1 is a front view of a diaper erected with one of fastening flaps being fastened to a front body;

Fig. 2 is a rear view of the diaper completely erected;

Fig. 3 is a fragmentary sectional view showing, in an enlarged scale, a line along which the front body, the rear body and the fastening flaps are bonded together in the proximities of their laterally opposite side edges and base ends, respectively;

Fig. 4 is an upper end view of the erected diaper;

Fig. 5 is a view similar to Fig. 4 but showing the erected diaper with laterally opposite side portions of the front body being cut apart from those of the rear body;

Fig. 6 is a plan view showing the inner side of the unfolded diaper;

Fig. 7 is an enlarged sectional view taken along a line X-X in Fig. 6; and

Fig. 8 is a perspective view illustrating a measuring method for separation-resistance of the bond line conducted using a test piece.

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#### PREFERRED EMBODIMENT OF THE INVENTION

Referring to Figs. 1 through 5, front and rear bodies 1, 2 of a diaper are longitudinally continuous. The front and rear bodies 1, 2 is folded back one on the other with laterally opposite side portions 3, 3 of the front body 1 at the level of waist zone being accurately laid upon the corresponding opposite side portions 4, 4 of the rear body 2, then a pair of fastening flaps 6 carrying on inner surfaces adjacent front ends thereof fastening spots 5 serving as fastening means are laid at base ends 7 thereof upon said laterally opposite side portions 3, 3 and 4, 4 of the front and rear bodies 1, 2 which have already been laid one upon the other, and these components 1, 2, 6 thus laid one upon another are intermittently bonded together under effect of heat or supersonic wave along lines 8 extending in parallel to and adjacent said side portions 3, 4 as well as said base ends 7 so as to leave respective outer edges of these components not bonded. The front body 1 is provided at locations 9a adjacent the respective bond lines 8 with cutting lines 9b extending in parallel to the respective bond lines 8 in the form of intermittent cuts or holes (i.e., so-called perforations) so that the front body 1 can be torn off along these cutting lines 9b from the rear body 2.

Bond strength (or separation-resistance) of each bond

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line 8 along which the front and rear bodies 1, 2 have been bonded together preferably should be 1000 g/inch or higher so that the laterally opposite side portions 3, 3, and 4, 4 of the respective bodies 1, 2 bonded together along said bond lines 8 may be reliably prevented from being separated from each other even if each bond line 8 is subjected to a tearing force possibly tending to separate off said laterally opposite side portions 3, 3 and 4, 4 from each other, for example, when it is desired to widen the waist-opening formed by bonding the laterally opposite side portions 3, 3 and 4, 4 at the level of waist zone of the front and rear bodies 1, 2 in the manner as has previously been mentioned in order to put the diaper on a wearer or when the front body 1 is pulled, with the diaper put on a wearer, to cut the front body 1 off from the rear body 2 along each cutting line 9b. It should be understood that the separation-resistance is measured using a test piece including a partial length of the bond line 8, which was sampled from the diaper by cutting off a portion surrounded by broken lines in Fig. 8. As shown, the test piece is a rectangular strip having a width of 1 inch and longitudinally extending from the bond line 8 over length larger than 10 mm in opposite directions, respectively. The test piece is held at longitudinally opposite ends thereof by a pair of chucks, respectively, so that



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initially the test piece linearly extends between said pair of chucks accurately over a distance of 20 mm with the bond line 8 lying in the middle. Then, the test piece is longitudinally tensioned at a rate of 100 mm/min and thereby a value (g) at a moment of separation occurring along the bond line 8 is determined as the separation-resistance value.

Referring to Figs. 1, 2 and 6, each blank of the diaper comprising longitudinally continuous front and rear bodies 1, 2 is then formed with laterally opposite concave edges 10 extending between the respective waist zones of the front and rear bodies 1, 2 so as to define respective leg-openings. This blank is composed, as best seen in Fig. 7, of a liquid-permeable topsheet 11, a liquid-impermeable backsheet 12 and an hourglass-shaped liquid-absorbent panel 13 sandwiched between said top- and backsheets 11, 12. The blank is further provided along the respective waist zones of the front and rear bodies 1, 2 as well as along the above-mentioned concave edges 10 destined to form the respective leg-openings with a plurality of parallelly extending thread-like elastic members 14, 15, respectively, which are attached under their longitudinally stretched condition between the top- and backsheets 11, 12 utilizing hot melt type adhesive. The elastic members 14 associated with the waist zone of the rear body 2 are arranged to

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occupy substantially all over this zone in parallel to one another with their spacings increasing from the outermost edge toward the inside of the waist zone so that a total elasticity of these elastic members 14 is higher than that of the elastic members 14 associated with the waist zone of the front body 1. It should be understood that, though not shown, the waist zone of the rear body 2 may be partially made from pieces of elastic fabric without providing both front and rear bodies 1, 2 with the respective elastic members 14 as in the illustrated embodiment. For example, such pieces of elastic fabric may be connected to the waist zone of the rear body 2 at laterally opposite side edges thereof by means of welding or the like. While not shown, it is also possible to form the fastening flaps 6 wholly or partially from elastic material without departure from the scope of the invention.

The waist zone of the front body 1 has a scaled narrow sheet 16 stuck on outer surface thereof in order to protect this surface which otherwise would be directly and repeatedly engaged by the fastening spots 5 of the respective fastening flaps 6. The scaled narrow sheet 16 functions also as an indicator adapted to conveniently indicate locations at which the respective fastening spots 5 are laid upon said outer surface. The fastening spots 5 may be formed by application of the adhesive conventionally

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used for such purpose or may be a piece of tape having thereon a plurality of hooks such as Velcro (trademark) or Magic Tape (trademark) both of which are well known to those skilled in the art. To use such piece of tape as the fastening spot 5, the scaled narrow sheet 16 must have a piled surface with which the hooks of the fastening spot 5 is effectively engageable.

The fastening flap 6 may be made from nonwoven fabric or laminate sheet consisting of such nonwoven fabric and plastic film or paper of fine quality. The topsheet 11 may be made of nonwoven fabric or porous plastic film. The backsheet 12 may be made of plastic film or laminate sheet consisting of such plastic film and nonwoven fabric. The scaled narrow sheet 16 may be made of plastic film or nonwoven fabric or felt, depending on a desired nature of the fastening spot 5.

The diaper constructed according to the teachings of this invention as has been described hereinabove can be put on a wearer as a pants type diaper, i.e., in its original configuration, for example, when it is desired to put the diaper on a wearer who is in standing up posture. While the fastening flaps 6 are principally unnecessary in this case, it is preferred that the fastening spots 5 are firmly engaged with the narrow sheet 16 at appropriate locations thereof to avoid undesirable movement of the diaper with

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respect to a wearer's body during use of the diaper (Fig. 4). When it is desired to put the diaper on a wearer who is in lying posture, the laterally opposite side portions of the front body 1 is torn off from those of the rear body 2 along the cutting lines 9b by pulling the front body 1 or the fastening flaps 6 so as to obtain the diaper of open type (Fig. 6) and, after having put it on a wearer, the fastening flaps 6 are folded inward onto the narrow sheet 16 so that the respective fastening spots 5 may be firmly engaged with said sheet 16 at desired locations thereof (Fig. 5).

The invention allows the diaper to be put on a wearer selectively either as the pants type diaper or as the open type diaper. The diaper of this invention is advantageous particularly in that, even if the bond lines extending along the laterally opposite side portions are subjected to a tearing force usually exerted thereon when the diaper is used as the pants type diaper, no separation occurs along the laterally opposite side portions of the front and rear bodies, because each of the bond lines has a separation-resistance as high as 1000 g/inch or higher.

After solid excretion has been discharged on the diaper, the front body may torn off from the rear body along the cutting lines provided along the laterally opposite side portions and thereby the diaper may be easily

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removed from a wearer without undesirably smearing the  
wearer's skin with solid excretion.

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The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A disposable diaper that comprises

- (a) a front body (1) and a rear body (2), said front body (1) being longitudinally continuous with said rear body (2) and folded over with respect to said rear body (2) so as to produce a completely formed waist opening, two completely formed leg openings and opposed side portions (3, 4) extending between each completely formed leg opening and said completely formed waist opening;
- (b) said side portions being formed by permanently bonding said front body (1) and said rear body (2) together along permanent bonding lines (8) having a separation resistance of at least 1000g/inch;
- (c) two fastening flaps (6), each having a base end bonded to a respective one of said side portions and an outer end that can be extended laterally with respect to the side portion to which it is attached;
- (d) fastening means (5) on each said fastening flaps (6) and adapted to engage said front body (1); and
- (e) two lines of perforations (9b) in said front body (1) each disposed adjacent one of said side portions and extend generally parallel to and inwardly of said permanent bonding lines (8), said two lines of perforations (9) each extending between one of said leg openings and said waist opening, and each located inwardly of said base end of an associated one of said fastening flaps (6), whereby said diaper can be put on a baby that is able to stand without the need to tear said front body (1) along said perforation lines (9b), or can be put on a baby that is not able or willing to stand by separating the front body (1) along said perforation lines (9b) without separating said permanent bonding lines (8), fitting the thus separated front body (1) and back body (2) around a baby, and then, after fitting said diaper on the baby, engaging said

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fastening means (5) of said fastening flaps (6) to a portion of said separated front body (1).

2. A disposable diaper according to Claim 1 wherein said front body (1) is provided with a narrow strip (16) which is adapted for engagement by said fastening means (5).

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FIG. 1

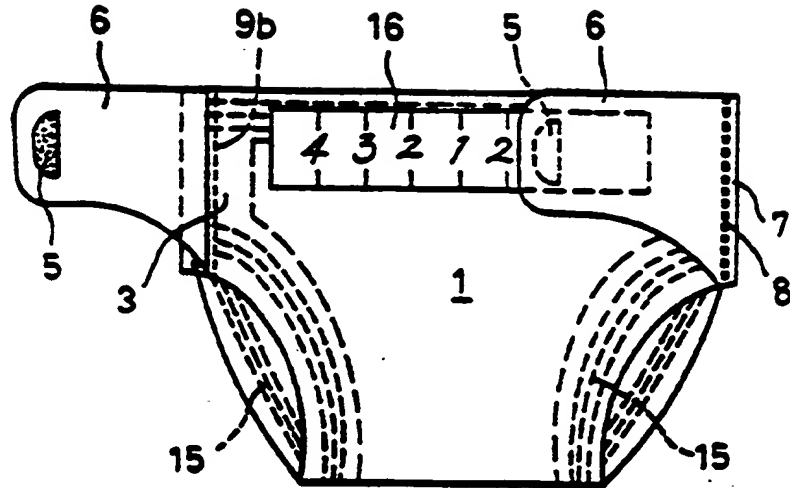
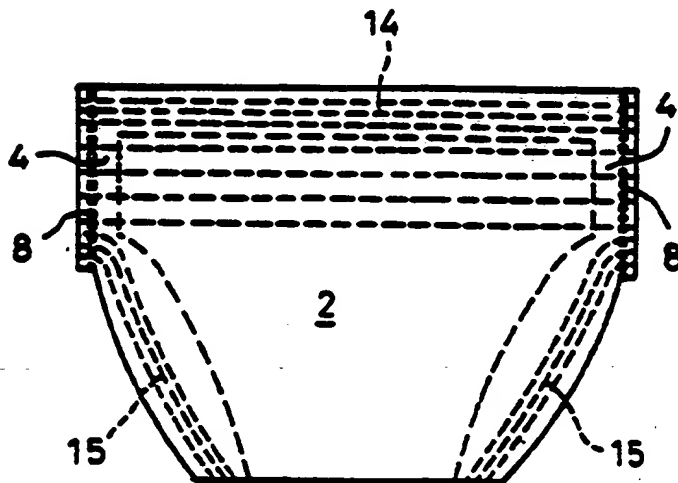


FIG. 2



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FIG.3

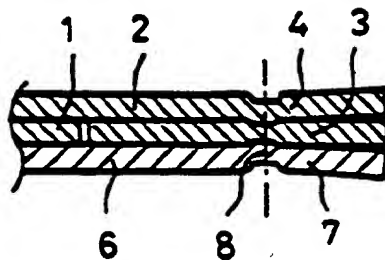


FIG.4

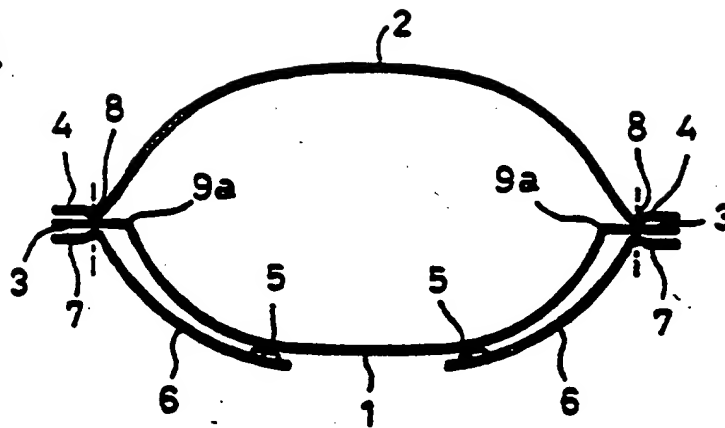
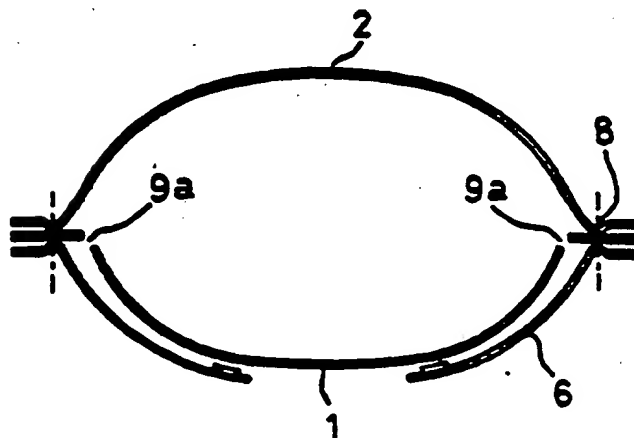


FIG.5



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FIG.6

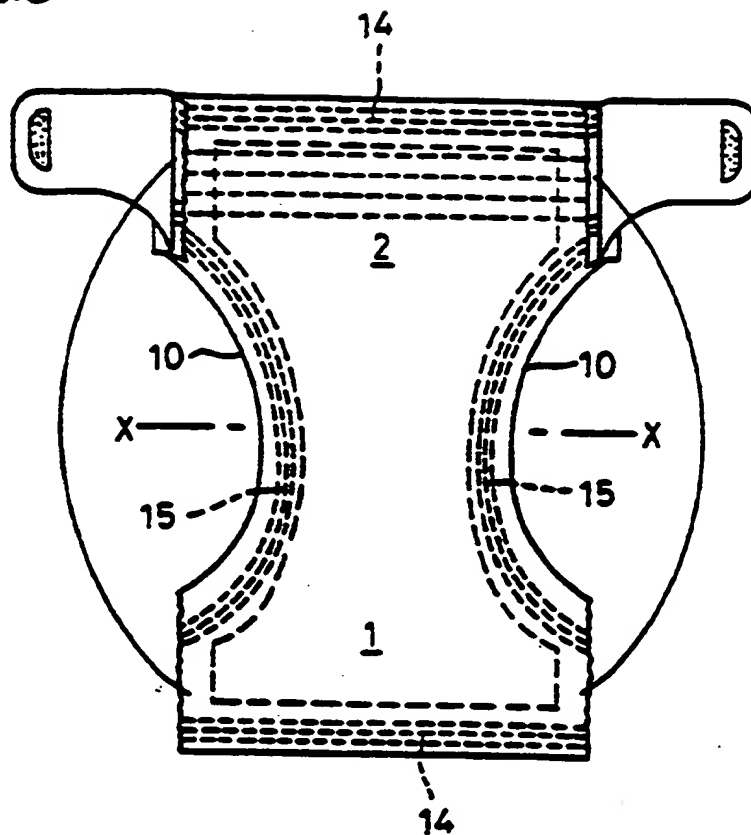
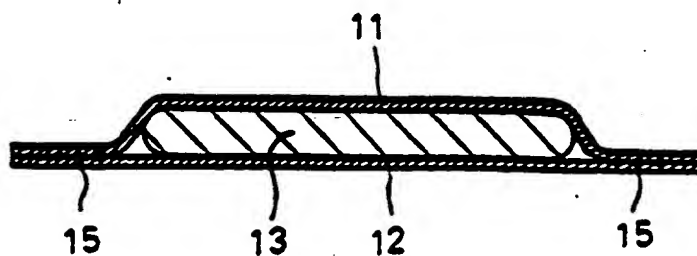


FIG.7



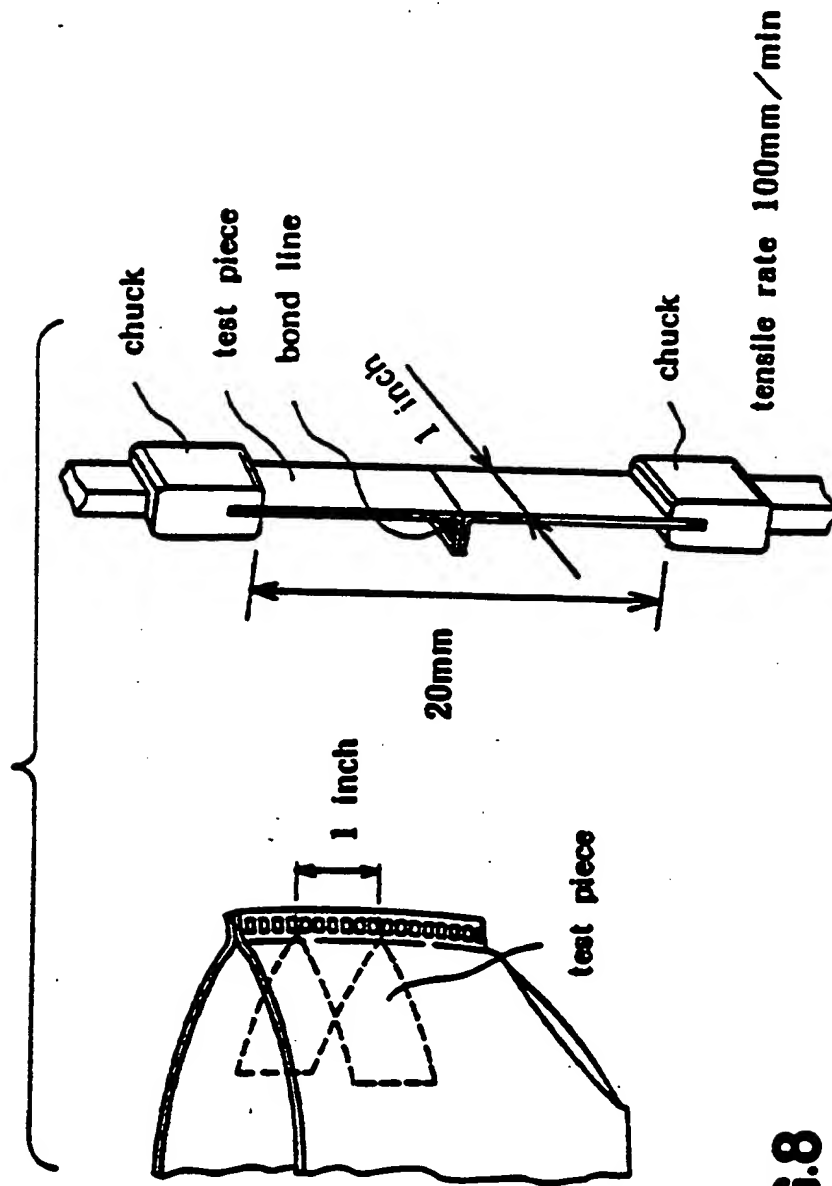
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**FIG.8**

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